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Summary of Nematicide Seed Treatments in Alabama Trials

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Control of the southern root-knot (*Meloidogne incognita*) and reniform (*Rotylenchulus reniformis*) nematodes is a serious problem in many Alabama cotton fields. Recently two seed treatments have been developed for control of these nematodes in cotton. *Avicta* developed by Syngenta was introduced in 2006 and *Aeris* developed by Bayer Crop Science will be marketed in the 2007 planting season. Both products are a great departure from the preplant fumigation with *Telone II* (1, 3, dichloropene) or the in-furrow treatment with *Temik* (aldicarb) that farmers have normally used. The seed treatments can be applied before shipping by the cotton seed companies or applied by a local seed treatment facility. These products require less handling of nematicides by the farmer and less stoppage during planting to fill nematicide hoppers. As a result, farmers can plant more acres in a day using these seed treatments.

The *Avicta* seed treatment which is a combination of a fungicide (Dynasty CST), an insecticide (Cruiser), and a nematicide (Abamectin), has been evaluated under Alabama field conditions for the last three seasons. The *Aeris* seed treatment which combines an insecticide (Gaucho) with a nematicide (Thiodicarb) was evaluated in Alabama during 2005 and 2006. A fungicide treatment is usually applied with the *Aeris* treatment.

Materials and Methods

The *Avicta* and *Aeris* seed treatments were evaluated in small plot studies in both northern and southern Alabama. Tests were designed as randomized complete blocks with four to six replications. In all tests, nematicide seed treatments were compared to *Temik*(5lb/A) applied in-furrow. Check plots included seed treatment with either Cruiser or Gaucho insecticides. *Avicta* + *Temik* (5lb/A) infurrow was included in the *Avicta* studies. The *Aeris* studies also include an untreated (black seed) treatment. Nematode samples were taken at planting, mid-season and at harvest. Both study sites have historically had medium to high levels of reniform nematodes. Yields were determined by picking each plot with a cotton picker designed for small plot harvest.

In 2005, the *Avicta* seed treatment was also evaluated in nine grower field trials across North and Central Alabama. These tests generally ranged from three to ten acres in size and treatments were replicated three times across the field. In these studies the *Avicta* seed treatment was compared to five pounds per acre of *Temik* applied in-furrow. The check treatment was a Cruiser seed treatment. All seeds were treated with the fungicide combination Dynasty CST. Nematode samples were taken preplant, at planting, June, July and at harvest. Seed cotton yields were harvested with the farmer's cotton picker and weighed in a boll buggy from each plot.

Yield Results

Avicta (2004 – 2006)

Average yields in the Northern Alabama tests (Table 1) revealed little difference between the Cruiser check treatment and the Avicta or Temik nematicide applications. Temik plus Avicta, however, produced the highest seed-cotton yields each season. The Temik plus Avicta treatment averaged 338 more pounds of seed-cotton than the check treatment over the three years of the North Alabama test. The South Alabama test (Table 2) showed little response to nematicide treatments compared to the Cruiser check treatment. In the South Alabama test, Temik plus Avicta did not increase cotton yields compared to the check treatment (Table 2).

The results of the nine on-farm studies conducted in 2005 are listed in Table 3. Only at the Whitehead site did we find no numerical increase in seed-cotton yields from the nematicide treatments of Temik (5 lb/A) or Avicta. In most fields small numerical increases in seed-cotton yields with both Temik applied in-furrow or Avicta seed treatment were found compared to the Dynasty CST + Cruiser check (Table 3). Statistically, most of the yield differences were not significantly different according to the LSD (0.1) test (Table 3). Seed-cotton yields averaged across sites revealed an 89 pound increase when Temik was applied in-furrow compared to a 126 pound increase with Avicta seed treatment.

Aeris (2005 – 2006)

In North Alabama (Table 4) Aeris, Gaucho and Temik produced higher yields than the black seed check treatment both years. Over the two years of testing, Aeris averaged a 282 pound increase compared to a 469 pound increase for Gaucho and a 403 pound increase for Temik (Table 4). In south Alabama, yield increases to treatments were much smaller. Aeris averaged a yield increase of 111 pounds compared to the check while Gaucho averaged 275 pounds and Temik increased average yields only 16 pounds (Table 4). There was no significant difference in yields between Gaucho, Temik or Aeris either year of the North or South Alabama testing (Table 4).

Discussion and Summary

In these studies there was no direct comparison between the Avicta or Aeris seed treatments. In all studies each product was compared to Temik(5lb/A) applied infurrow at planting. In most studies there were no significant differences in cotton yields between Temik and either Avicta or Aeris seed treatment. The troubling result of these tests, however, is the lack of a significant yield increase when Temik, Avicta or Aeris cotton yields are compared to the insecticide seed treatments of Cruiser or Gaucho. Neither Gaucho nor Cruiser has any proven nematicide activity, yet seed-cotton yields were numerically higher than Temik, Avicta, or Aeris in many of these tests. In fact there were no significant yield differences between Cruiser or Gaucho treatments and Temik, Avicta, or Aeris in any of the studies.

Proving significant differences in nematicide studies is difficult due to the highly variable nature of the reniform nematode in the soil and the variable environmental conditions that often affects cotton yields. This data however, highlights the difficulty of controlling reniform nematodes with the current nematicides products available to the Alabama cotton farmer. With the current data on chemical control of reniform nematodes, crop rotation is an option more cotton farmers must consider in dealing with reniform infested fields.

Table 1. Seed-cotton yields (lb/A) in Northern Alabama nematicide studies, 2004-2006.

Years	Nematicide Treatments				LSD (0.05)
	Cruiser	Avicta	Temik	Temik + Avicta	
2004	3758	3747	3915	4015	469
2005	3427	3625	3009	3909	676
2006	2520	2486	2460	2796	402
AVG	3235	3286	3128	3573	

Table 2. Seed-cotton yields (lb/A) in Southern Alabama nematicide studies, 2005-2006.

Years	Nematicide Treatments				LSD (0.05)
	Cruiser	Avicta	Temik	Temik + Avicta	
2005	2513	2255	2501	2488	343
2006	2201	2302	2181	2263	241
AVG	2357	2279	2341	2376	

Table 3. Seed-cotton yields (lb/A) in on-farm nematicide tests in North and Central Alabama, 2005.

Treatment	Shaw	Murph	Hargr.	Thort.	Hamilt	Lee	Jennin	Leavel	White	Avg
Temik	1537	2490	2270	2103	1300	2650	2247	1727	1437	1973
Cruiser	1773	2260	1917	1910	1270	2540	2000	1660	1633	1884
Avicta	1803	2473	2083	2010	1360	2850	2267	1683	1563	2010
LSD (0.1)	426	318	263	145	171	334	444	128	272	

Table 4. Seed-cotton yields (lb/A) in Northern and Southern Alabama nematicide studies, 2005-2006.

Treatments	Northern Alabama			Southern Alabama		
	2005	2006	AVG	2005	2006	AVG
Black seed	2504	2395	2450	1741	1945	1843
Gaucho	3192	2646	2919	2118	2117	2118
Aeris	2702	2762	2732	2085	2022	2054
Temik	2815	2890	2853	1827	1890	1859
LSD (0.05)	785	329		301	304	